



**STATE OF NEW HAMPSHIRE
BEFORE THE
PUBLIC UTILITIES COMMISSION**

Docket No. DE 19-064

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Distribution Service Rate Case

**DIRECT TESTIMONY
OF
PHILIP E. GREENE**

April 30, 2019

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ATTACHMENTS

Attachment	Title
PEG-1	Lead-Lag Study Calculations

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I. INTRODUCTION AND QUALIFICATIONS

Q. Please state your full name and business address.

A. My name is Philip E. Greene. My business address is 15 Buttrick Road, Londonderry, New Hampshire.

Q. Please state by whom you are employed and your position.

A. I am a Senior Financial Regulatory Analyst for Liberty Utilities Service Corp. ("Liberty"), which provides service to Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities ("Granite State" or the "Company"). My responsibilities include roles in Financial Planning and Analysis budgeting, financial reporting, capital planning support, and rate case revenue requirement support.

Q. Please describe your educational background and training.

A. I graduated from the University of Massachusetts, Dartmouth, in 2001 with a Bachelor of Science in Accounting.

Q. What is your professional background?

A. I joined Liberty Utilities as a Senior Financial Regulatory Analyst in November 2017. Prior to my employment at Liberty Utilities I was employed by American Tower Corporation as a Program Manager in Strategic Real Estate from 2016 to 2017, with primary role of developing programs around tenant terminations and asset divestitures. Prior to my position in Strategic Real Estate I was a Project Manager in Mergers & Acquisitions for American Tower from 2008 to 2016, responsibilities included financial and non-financial evaluation of opportunities to acquire tower and other revenue

1 generating assets and project managing pre-acquisition diligence, closing, and integration
2 activities. Prior to 2008 I held positions as Site Financial Supervisor and Site Financial
3 Analyst in Land Management, also with American Tower Corporation. Prior to Joining
4 American Tower Corporation I held positions as Senior Staff Accountant and Staff
5 Accountant with the Accounting Firm Bonanno, Savino & Davies, P.C. located in
6 Needham, Massachusetts, from 2001 to 2004.

7 **Q. Have you previously testified in regulatory proceedings before the New Hampshire**
8 **Public Utilities Commission (the “Commission”)?**

9 A. No.

10 **II. PURPOSE AND OVERVIEW OF TESTIMONY**

11 **Q. What is the purpose of your testimony?**

12 A. The purpose of my testimony is to explain the Company’s lead-lag study, which is used
13 to determine the cash working capital (CWC) requirement. My analysis is supported by
14 the data presented in Attachment PEG-1.

15 **Q. Please define the term “cash working capital” as a rate base component.**

16 A. The term “cash working capital” refers to the net funds required by the Company to pay
17 for goods and services between the time of the cash outlay by the Company for such
18 goods and services and the time revenues are recovered from customers. For the
19 Company, the cost of goods and services includes labor expenses, non-labor operations,
20 and maintenance (“O&M”) expenses, including federal taxes, local taxes, and payroll-
21 related taxes.

1 **Q. How did you derive the cash working capital requirement?**

2 A. The CWC requirement was determined using the results of a lead-lag study, which
3 compares the net difference between the revenue lag and the expense lag. The revenue
4 lag represents the number of days between the time customers receive their service and
5 the time customer payments are made available to the Company. The longer the revenue
6 lag, the more cash the Company needs to fund its day-to-day operations. The expense lag
7 represents the number of days between the time the Company receives goods and
8 services used to provide service, and the time payments are made for those goods and
9 services. The longer the expense lag, the less cash the Company needs to fund its day-to-
10 day operations. Together, the revenue lag and expense lag are used to measure the net
11 lead/lag to determine the CWC requirement, which becomes a component of the
12 Company's rate base.

13 **Q. Are the results of your lead-lag study an accurate calculation of the Company's**
14 **CWC requirement?**

15 A. Yes. The study provides an accurate assessment of the Company's actual CWC needs
16 during the rate case test year.

17 **III. LEAD-LAG STUDY APPROACH**

18 **Q. Please summarize the results and the approach of the lead-lag study you conducted.**

19 A. The lead-lag study shows a net lag of 25.53 days for the rate case test year January 1
20 through December 31, 2018. The CWC calculation is based on the result of the lead-lag

1 study, which is then applied to the rate case test year amounts for O&M expenses and
2 taxes.

3 **Q. How did you develop the net lead/lag days in your study?**

4 A. The revenue lag is measured from the time service is provided to customers until the time
5 payment is received from customers. Expense lags are measured from the time a service
6 is provided to the Company until payment is made by the Company for that service.
7 These lags are measured in days, converted to dollar-days, and summarized for each
8 element in the lead-lag study. The difference between the revenue lag and the expense
9 lag determines if there is a net revenue lag (revenue lag days are greater than the expense
10 lag days for a component) or a net expense lead (revenue lag days are less than the
11 expense lag days for a component).

12 **Q. Please describe the results of your lead-lag study.**

13 A. The results show the total number of revenue lag days and expense lag days for the
14 Company during the CWC test year. The net difference between the computed revenue
15 lag days and expense lag days was then multiplied by the average daily revenue
16 requirements of the system to produce the net cash working capital required by the
17 Company.

18 **IV. REVENUE LAG**

19 **Q. Please describe the components of the revenue lag.**

20 A. Revenue lag consists of three components: (1) the service lag; (2) the billing lag; and (3)
21 the collection lag. The total number of days produced by the three components

1 represents the amount of time between providing utility service to customers and the
2 receipt of the related revenues for such service. Together, these revenue lag components
3 comprise the total revenue lag days.

4 **Q. What is the service lag?**

5 A. The service lag represents the midpoint of the service period, *i.e.*, the time between the
6 start of the billing month and the end of the billing month. My approach is to rely on the
7 midpoint of the service period, which assumes that service will be provided evenly over
8 the service period.

9 **Q. What is the billing lag?**

10 A. The billing lag is the time between the bill generation date and the date bills are sent to
11 customers. The billing lag begins the day the bill is generated and ends with the
12 recording and mailing of the customer bill. This lag includes the process for review and
13 validation of usage and billing.

14 **Q. What is the collection lag?**

15 A. Collection lag reflects the time between recording and bill mailing for the services
16 rendered and the receipt of payment from customers for the revenues billed. The
17 collection lag was determined by the accounts receivable turnover ratio method. This is
18 calculated by taking the average accounts receivable balance divided by the average daily
19 revenues for the test year.

1 **Q. What is the total revenue lag component for the lead-lag calculation?**

2 A. Each of these revenue lag components was totaled to arrive at the total revenue lag of
3 60.37 days, as shown on Attachment PEG-1, Page 2.

4 **V. EXPENSE LAG**

5 **A. Operation and Maintenance Expenses**

6 **Q. How did you determine the expense lag days for O&M expenses?**

7 A. I separated total system expenses into three groups: (1) regular payroll costs; (2) annual
8 performance bonus payroll costs; and (3) third-party O&M expenses. I measured the
9 expense lag days for each of these groups independently. A summary of the O&M
10 expense lag is shown on Attachment PEG-1, Page 8.

11 **Q. How were the lag days for the payroll expenses determined?**

12 A. I based the expense lag days for payroll on the Company's wage payment process, which
13 pays employees on a bi-weekly basis or weekly basis. I calculated the expense lag days
14 for payroll costs by determining the average days of service being paid and adding the
15 midpoint of the service period to the number of days between the end of each service
16 period and the date of payment to employees. This calculation produces the number of
17 total days between the middle of the period for which employees' wages are recorded and
18 the date on which payments are disbursed. These calculations were based on actual
19 historical Company data for the CWC test year. Holidays are also based on actual
20 historical data for the CWC test year.

1 **Q. Did you make any adjustment to the payroll lag days in your lead-lag study?**

2 A. Yes. I made an adjustment for vacation pay, which recognizes that vacation pay is
3 earned before it is actually taken. The vacation pay adjustment is calculated based on the
4 average payroll lag days and the midpoint of the days in the year.

5 **Q. How were the lag days for the annual performance bonus determined?**

6 A. The Company's annual performance bonus is paid annually in April for the preceding
7 calendar year. The lag days were determined based on the midpoint of the performance
8 period and the date bonuses were paid.

9 **Q. How were the lag days determined for third-party O&M expenses?**

10 A. I based the measure of expense lag days for the expenses in this group on a sampling of
11 these expenses for the test year. I then identified the sample invoices that were greater
12 than \$50,000 and reviewed the invoice to determine the service period. For this sample
13 the mid-point of the service period and the payment date were used to calculate the
14 expense lag for third-party O&M expenses. For all other invoices greater than \$50,000
15 not included in the sample, the invoice date and payment date were used to determine the
16 expense lag number of days for non-payroll related O&M expenses. Since the sample
17 included only invoices greater than \$50,000, and since in most cases the service period is
18 expected to precede the invoice date, the results of expense lag on third party O&M
19 expense lag can be considered conservative.

B. Federal Income Tax Expense

Q. What are the lag days determined for federal income taxes?

A. The lag days for federal income taxes were calculated using the calendar year as the service period because the income taxes would be earned throughout the year. The midpoint of the service period would be July 2. Payment of estimated tax for the year is made quarterly on April 15, June 15, September 15, and December 15.

Q. What taxes are included in the taxes other than income taxes?

A. This group of taxes consists of payroll-related taxes (FICA, federal unemployment, and state unemployment) and property taxes.

Q. How were the lag days calculated for each of those taxes?

A. The payment lags for FICA taxes were calculated from the pay period end date to the respective payment dates of the taxes. Federal unemployment taxes are paid after the end of each quarter based on that quarter's wages up to the annual limit. State unemployment taxes were calculated from the pay period end date to the respective payment dates of the taxes. The payment lag for property taxes was calculated from the midpoint of the period for which the tax was assessed to the payment date.

C. Non-Cash Items

Q. Please explain why you excluded non-cash items from your lead-lag study.

A. This study uses the cash method and therefore excludes non-cash items. As such, non-cash items, including depreciation, amortization, deferred income taxes, and return

(including return on equity, and interest on long-term debt), have not been included in my lead-lag study.

VI. CONCLUSION

Q. What were the results of the lead-lag study?

A. The CWC requirement for the Company is based on a net lag of 25.53 days for the rate case test year January 1 through December 31, 2018.

Q. Are the results of this lead-lag study reasonable?

A. Yes, the results of the lead-lag study reflect the Company's practices, and are fair and reasonable. In addition, the methods used in the study are consistent with studies performed in other jurisdictions. The resulting CWC requirement should properly be included in the Company's rate base.

Q. Does this conclude your testimony?

A. Yes, it does.

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Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
Cash Working Capital Requirement

Line	Description	Test Year	Average Daily Amount	Revenue Lag	Expense Lag	Net (Lead)/Lag Days	Working Capital Requirement
1	Labor & Operations and Maintenance Expenses						
2	Labor (Payroll)	\$ 9,185,610	\$ 25,166	60.37	(57.54)	2.83	\$ 71,117
3	Non-Labor O&M	6,770,217	\$ 18,549	60.37	(42.25)	18.12	\$ 336,047
4	Total Labor & Non-Labor Expenses	\$ 15,955,828	\$ 43,715				\$ 407,164
5	Income Taxes						
6	Federal & State Income Taxes	\$ 233,034	\$ 638	60.37	(36.00)	24.37	\$ 15,557
7	Total Federal Income Taxes	\$ 233,034	\$ 638				\$ 15,557
8	Taxes Other Than Income Taxes						
9	Payroll Taxes	\$ 334,854	\$ 917	60.37	(18.98)	41.39	\$ 37,969
10	Property Taxes	4,849,638	\$ 13,287	60.37	17.46	77.83	\$ 1,034,132
11	Taxes Other Than Income Taxes	\$ 5,184,492	\$ 14,204				\$ 1,072,102
12	Total	\$ 21,373,354	\$ 58,557			25.53	\$ 1,494,823

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
Revenue Lag

Line	Description	Revenue Lag
1	Service Lag	15.21
2	Billing Lag	4.26
3	Collection Lag	40.90
4	<u>Total Revenue Lag</u>	<u>60.37</u>

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
Billing Lag

Line	Cycle Bill Read Date	Bill Mail Date	Billing Lag
1	12/29/17	1/4/18	6.00
2	1/2/18	1/4/18	2.00
3	1/3/18	1/8/18	5.00
4	1/3/18	1/8/18	5.00
5	1/4/18	1/10/18	6.00
6	1/5/18	1/11/18	6.00
7	1/10/18	1/12/18	2.00
8	1/10/18	1/17/18	7.00
9	1/11/18	1/17/18	6.00
10	1/11/18	1/18/18	7.00
11	1/16/18	1/19/18	3.00
12	1/17/18	1/22/18	5.00
13	1/18/18	1/23/18	5.00
14	1/19/18	1/24/18	5.00
15	1/19/18	1/25/18	6.00
16	1/23/18	1/26/18	3.00
17	1/24/18	1/26/18	2.00
18	1/24/18	1/29/18	5.00
19	1/26/18	1/31/18	5.00
20	1/26/18	1/31/18	5.00
21	1/30/18	2/2/18	3.00
22	1/30/18	2/6/18	7.00
23	1/31/18	2/6/18	6.00
24	1/31/18	2/6/18	6.00
25	2/2/18	2/8/18	6.00
26	2/5/18	2/8/18	3.00
27	2/7/18	2/9/18	2.00
28	2/7/18	2/12/18	5.00
29	2/8/18	2/13/18	5.00
30	2/13/18	2/16/18	3.00
31	2/13/18	2/17/18	4.00
32	2/13/18	2/21/18	8.00
33	2/15/18	2/21/18	6.00
34	2/16/18	2/22/18	6.00
35	2/20/18	2/23/18	3.00
36	2/20/18	2/23/18	3.00
37	2/20/18	2/26/18	6.00
38	2/21/18	2/27/18	6.00
39	2/26/18	3/1/18	3.00
40	2/26/18	3/1/18	3.00
41	2/28/18	3/5/18	5.00
42	2/28/18	3/5/18	5.00
43	3/2/18	3/6/18	4.00
44	3/2/18	3/7/18	5.00
45	3/6/18	3/9/18	3.00
46	3/6/18	3/9/18	3.00
47	3/7/18	3/13/18	6.00
48	3/7/18	3/13/18	6.00
49	3/12/18	3/15/18	3.00
50	3/14/18	3/16/18	2.00
51	3/15/18	3/20/18	5.00
52	3/16/18	3/21/18	5.00
53	3/19/18	3/22/18	3.00
54	3/20/18	3/23/18	3.00
55	3/21/18	3/23/18	2.00
56	3/22/18	3/27/18	5.00
57	3/23/18	3/29/18	6.00
58	3/23/18	3/29/18	6.00
59	3/27/18	3/30/18	3.00
60	3/27/18	3/30/18	3.00
61	3/29/18	4/3/18	5.00
62	4/2/18	4/4/18	2.00
63	4/2/18	4/6/18	4.00
64	4/4/18	4/6/18	2.00

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
Billing Lag

Line	Cycle Bill Read Date	Bill Mail Date	Billing Lag
65	4/5/18	4/10/18	5.00
66	4/5/18	4/10/18	5.00
67	4/9/18	4/12/18	3.00
68	4/10/18	4/13/18	3.00
69	4/11/18	4/16/18	5.00
70	4/12/18	4/17/18	5.00
71	4/13/18	4/18/18	5.00
72	4/17/18	4/20/18	3.00
73	4/18/18	4/23/18	5.00
74	4/19/18	4/24/18	5.00
75	4/20/18	4/25/18	5.00
76	4/23/18	4/26/18	3.00
77	4/24/18	4/26/18	2.00
78	4/24/18	4/27/18	3.00
79	4/26/18	5/1/18	5.00
80	4/27/18	5/1/18	4.00
81	4/26/18	5/3/18	7.00
82	4/27/18	5/3/18	6.00
83	4/30/18	5/7/18	7.00
84	5/1/18	5/7/18	6.00
85	5/2/18	5/9/18	7.00
86	5/3/18	5/10/18	7.00
87	5/4/18	5/11/18	7.00
88	5/7/18	5/14/18	7.00
89	5/8/18	5/15/18	7.00
90	5/9/18	5/15/18	6.00
91	5/11/18	5/18/18	7.00
92	5/14/18	5/21/18	7.00
93	5/15/18	5/22/18	7.00
94	5/16/18	5/24/18	8.00
95	5/18/18	5/24/18	6.00
96	5/21/18	5/24/18	3.00
97	5/22/18	5/29/18	7.00
98	5/23/18	5/30/18	7.00
99	5/24/18	6/1/18	8.00
100	5/25/18	6/1/18	7.00
101	5/31/18	6/5/18	5.00
102	6/1/18	6/6/18	5.00
103	6/4/18	6/7/18	3.00
104	6/5/18	6/7/18	2.00
105	6/8/18	6/11/18	3.00
106	6/6/18	6/11/18	5.00
107	6/8/18	6/13/18	5.00
108	6/12/18	6/14/18	2.00
109	6/12/18	6/18/18	6.00
110	6/14/18	6/18/18	4.00
111	6/15/18	6/20/18	5.00
112	6/18/18	6/21/18	3.00
113	6/19/18	6/22/18	3.00
114	6/20/18	6/25/18	5.00
115	6/21/18	6/26/18	5.00
116	6/22/18	6/27/18	5.00
117	6/25/18	6/28/18	3.00
118	6/26/18	6/28/18	2.00
119	6/27/18	6/29/18	2.00
120	6/27/18	7/2/18	5.00
121	6/29/18	7/5/18	6.00
122	6/29/18	7/5/18	6.00
123	7/3/18	7/9/18	6.00
124	7/5/18	7/9/18	4.00
125	7/6/18	7/11/18	5.00
126	7/9/18	7/11/18	2.00
127	7/10/18	7/13/18	3.00
128	7/11/18	7/13/18	2.00
129	7/12/18	7/17/18	5.00

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
Billing Lag

Line	Cycle Bill Read Date	Bill Mail Date	Billing Lag
130	7/13/18	7/17/18	4.00
131	7/16/18	7/19/18	3.00
132	7/17/18	7/20/18	3.00
133	7/18/18	7/23/18	5.00
134	7/19/18	7/24/18	5.00
135	7/20/18	7/25/18	5.00
136	7/23/18	7/26/18	3.00
137	7/25/18	7/27/18	2.00
138	7/26/18	7/30/18	4.00
139	7/27/18	7/31/18	4.00
140	7/27/18	7/31/18	4.00
141	7/31/18	8/3/18	3.00
142	8/1/18	8/6/18	5.00
143	8/2/18	8/6/18	4.00
144	8/3/18	8/7/18	4.00
145	8/6/18	8/9/18	3.00
146	8/7/18	8/9/18	2.00
147	8/8/18	8/10/18	2.00
148	8/9/18	8/13/18	4.00
149	8/9/18	8/14/18	5.00
150	8/10/18	8/15/18	5.00
151	8/14/18	8/17/18	3.00
152	8/15/18	8/20/18	5.00
153	8/16/18	8/21/18	5.00
154	8/17/18	8/22/18	5.00
155	8/20/18	8/22/18	2.00
156	8/21/18	8/24/18	3.00
157	8/22/18	8/27/18	5.00
158	8/23/18	8/28/18	5.00
159	8/23/18	8/29/18	6.00
160	8/27/18	8/30/18	3.00
161	8/29/18	8/31/18	2.00
162	8/30/18	9/5/18	6.00
163	8/31/18	9/6/18	6.00
164	9/4/18	9/6/18	2.00
165	9/5/18	9/10/18	5.00
166	9/6/18	9/10/18	4.00
167	9/7/18	9/12/18	5.00
168	9/10/18	9/12/18	2.00
169	9/11/18	9/14/18	3.00
170	9/12/18	9/14/18	2.00
171	9/13/18	9/18/18	5.00
172	9/17/18	9/19/18	2.00
173	9/18/18	9/21/18	3.00
174	9/19/18	9/24/18	5.00
175	9/19/18	9/25/18	6.00
176	9/24/18	9/26/18	2.00
177	9/24/18	9/26/18	2.00
178	9/25/18	9/27/18	2.00
179	9/26/18	9/28/18	2.00
180	9/26/18	9/28/18	2.00
181	9/28/18	10/2/18	4.00
182	10/1/18	10/3/18	2.00
183	10/2/18	10/4/18	2.00
184	10/3/18	10/5/18	2.00
185	10/4/18	10/9/18	5.00
186	10/5/18	10/10/18	5.00
187	10/9/18	10/11/18	2.00
188	10/10/18	10/12/18	2.00
189	10/11/18	10/16/18	5.00
190	10/12/18	10/17/18	5.00
191	10/15/18	10/18/18	3.00
192	10/16/18	10/19/18	3.00
193	10/17/18	10/19/18	2.00
194	10/18/18	10/23/18	5.00

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
Billing Lag

Line	Cycle Bill Read Date	Bill Mail Date	Billing Lag
195	10/19/18	10/24/18	5.00
196	10/22/18	10/24/18	2.00
197	10/23/18	10/25/18	2.00
198	10/24/18	10/29/18	5.00
199	10/24/18	10/29/18	5.00
200	10/25/18	10/30/18	5.00
201	10/29/18	11/1/18	3.00
202	10/30/18	11/2/18	3.00
203	10/31/18	11/5/18	5.00
204	11/1/18	11/5/18	4.00
205	11/2/18	11/6/18	4.00
206	11/5/18	11/7/18	2.00
207	11/5/18	11/8/18	3.00
208	11/7/18	11/13/18	6.00
209	11/9/18	11/14/18	5.00
210	11/9/18	11/15/18	6.00
211	11/13/18	11/16/18	3.00
212	11/14/18	11/19/18	5.00
213	11/15/18	11/20/18	5.00
214	11/16/18	11/21/18	5.00
215	11/19/18	11/26/18	7.00
216	11/20/18	11/26/18	6.00
217	11/22/18	11/27/18	5.00
218	11/26/18	11/28/18	2.00
219	11/26/18	11/29/18	3.00
220	11/26/18	11/29/18	3.00
221	11/29/18	12/3/18	4.00
222	11/30/18	12/4/18	4.00
223	12/3/18	12/5/18	2.00
224	12/4/18	12/6/18	2.00
225	12/5/18	12/7/18	2.00
226	12/5/18	12/7/18	2.00
227	12/7/18	12/12/18	5.00
228	12/10/18	12/12/18	2.00
229	12/11/18	12/13/18	2.00
230	12/12/18	12/14/18	2.00
231	12/13/18	12/18/18	5.00
232	12/14/18	12/19/18	5.00
233	12/17/18	12/20/18	3.00
234	12/18/18	12/21/18	3.00
235	12/19/18	12/24/18	5.00
236	12/19/18	12/24/18	5.00
237	12/21/18	12/27/18	6.00
238	12/21/18	12/28/18	7.00
239	12/27/18	12/31/18	4.00
240	12/27/18	12/31/18	4.00
241	Average		4.26

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
Collection Lag

Line	Month Start	Month End	Revenues		A/R Balance	
			Monthly Billed Revenues	Daily Average Revenues	Monthly Balance	Collection Lag
1	1/1/2018	1/31/2018	\$ 9,336,310	\$ 301,171	\$ 12,237,544	
2	2/1/2018	2/28/2018	8,339,213	297,829	10,652,181	
3	3/1/2018	3/31/2018	8,030,574	259,051	11,370,657	
4	4/1/2018	4/30/2018	7,650,209	255,007	10,041,101	
5	5/1/2018	5/31/2018	7,002,414	225,884	9,243,056	
6	6/1/2018	6/30/2018	8,115,425	270,514	11,312,968	
7	7/1/2018	7/31/2018	9,427,852	304,124	13,187,202	
8	8/1/2018	8/31/2018	10,057,582	324,438	12,044,552	
9	9/1/2018	9/30/2018	9,129,873	304,329	13,311,244	
10	10/1/2018	10/31/2018	7,458,512	240,597	10,220,681	
11	11/1/2018	11/30/2018	7,535,632	251,188	10,090,595	
12	12/1/2018	12/31/2018	9,093,725	293,346	12,384,278	
		Average		\$ 277,290	\$ 11,341,338	40.90
						40.90

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
O&M Expenses

Line	Description	Expense	(Lead)/Lag Days	Dollar Days
1	Labor-Related - O&M Expenses	\$ 9,185,610	(57.54)	\$ (528,553,102)
2	Non-Labor - Other O&M Expenses	6,770,217	(42.25)	\$ (286,042,569)
3	Total O&M Expenses	\$ 15,955,828	(51.05)	\$ (814,595,671)

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
O&M Expenses - Payroll

Line	Description	Expense	Percent	(Lead)/Lag Days	Dollar Days
1	Regular Payroll - Weekly	\$ 3,866,692	54.6%	(8.50)	\$ (32,866,880)
2	Regular Payroll - Bi-Weekly	\$ 3,215,161	45.4%	(12.00)	\$ (38,581,935)
3	Regular Payroll - Total	\$ 7,081,853	100.00%	(10.09)	\$ (71,448,815)
4	Regular Payroll - Regular Pay	\$ 7,081,853	81.81%	(10.09)	\$ (71,448,815)
5	Regular Payroll - Vacation Pay	1,574,813	18.19%	(192.59)	(303,291,667)
6	Regular Payroll - Adjusted for Vacation Pay - Total	\$ 8,656,666	100.00%	(43.29)	\$ (374,740,482)
7	Annual Performance Incentive Pay	\$ 528,944		(290.79)	\$ (153,812,621)
8	Payroll - Total	\$ 9,185,610		(57.54)	\$ (528,553,102)

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
O&M Expenses - Labor-Related - Regular Payroll - Weekly

Line	Pay Period - Start	Pay Period - End	Pay Period - Midpoint	Pay Date	(Lead)/Lag Days
1	Sunday, December 31, 2017	Saturday, January 06, 2018	Wednesday, January 03, 2018	Friday, January 12, 2018	(8.50)
2	Sunday, January 07, 2018	Saturday, January 13, 2018	Wednesday, January 10, 2018	Friday, January 19, 2018	(8.50)
3	Sunday, January 14, 2018	Saturday, January 20, 2018	Wednesday, January 17, 2018	Friday, January 26, 2018	(8.50)
4	Sunday, January 21, 2018	Saturday, January 27, 2018	Wednesday, January 24, 2018	Friday, February 02, 2018	(8.50)
5	Sunday, January 28, 2018	Saturday, February 03, 2018	Wednesday, January 31, 2018	Friday, February 09, 2018	(8.50)
6	Sunday, February 04, 2018	Saturday, February 10, 2018	Wednesday, February 07, 2018	Friday, February 16, 2018	(8.50)
7	Sunday, February 11, 2018	Saturday, February 17, 2018	Wednesday, February 14, 2018	Friday, February 23, 2018	(8.50)
8	Sunday, February 18, 2018	Saturday, February 24, 2018	Wednesday, February 21, 2018	Friday, March 02, 2018	(8.50)
9	Sunday, February 25, 2018	Saturday, March 03, 2018	Wednesday, February 28, 2018	Friday, March 09, 2018	(8.50)
10	Sunday, March 04, 2018	Saturday, March 10, 2018	Wednesday, March 07, 2018	Friday, March 16, 2018	(8.50)
11	Sunday, March 11, 2018	Saturday, March 17, 2018	Wednesday, March 14, 2018	Friday, March 23, 2018	(8.50)
12	Sunday, March 18, 2018	Saturday, March 24, 2018	Wednesday, March 21, 2018	Friday, March 30, 2018	(8.50)
13	Sunday, March 25, 2018	Saturday, March 31, 2018	Wednesday, March 28, 2018	Friday, April 06, 2018	(8.50)
14	Sunday, April 01, 2018	Saturday, April 07, 2018	Wednesday, April 04, 2018	Friday, April 13, 2018	(8.50)
15	Sunday, April 08, 2018	Saturday, April 14, 2018	Wednesday, April 11, 2018	Friday, April 20, 2018	(8.50)
16	Sunday, April 15, 2018	Saturday, April 21, 2018	Wednesday, April 18, 2018	Friday, April 27, 2018	(8.50)
17	Sunday, April 22, 2018	Saturday, April 28, 2018	Wednesday, April 25, 2018	Friday, May 04, 2018	(8.50)
18	Sunday, April 29, 2018	Saturday, May 05, 2018	Wednesday, May 02, 2018	Friday, May 11, 2018	(8.50)
19	Sunday, May 06, 2018	Saturday, May 12, 2018	Wednesday, May 09, 2018	Friday, May 18, 2018	(8.50)
20	Sunday, May 13, 2018	Saturday, May 19, 2018	Wednesday, May 16, 2018	Friday, May 25, 2018	(8.50)
21	Sunday, May 20, 2018	Saturday, May 26, 2018	Wednesday, May 23, 2018	Friday, June 01, 2018	(8.50)
22	Sunday, May 27, 2018	Saturday, June 02, 2018	Wednesday, May 30, 2018	Friday, June 08, 2018	(8.50)
23	Sunday, June 03, 2018	Saturday, June 09, 2018	Wednesday, June 06, 2018	Friday, June 15, 2018	(8.50)
24	Sunday, June 10, 2018	Saturday, June 16, 2018	Wednesday, June 13, 2018	Friday, June 22, 2018	(8.50)
25	Sunday, June 17, 2018	Saturday, June 23, 2018	Wednesday, June 20, 2018	Friday, June 29, 2018	(8.50)
26	Sunday, June 24, 2018	Saturday, June 30, 2018	Wednesday, June 27, 2018	Friday, July 06, 2018	(8.50)
27	Sunday, July 01, 2018	Saturday, July 07, 2018	Wednesday, July 04, 2018	Friday, July 13, 2018	(8.50)
28	Sunday, July 08, 2018	Saturday, July 14, 2018	Wednesday, July 11, 2018	Friday, July 20, 2018	(8.50)
29	Sunday, July 15, 2018	Saturday, July 21, 2018	Wednesday, July 18, 2018	Friday, July 27, 2018	(8.50)
30	Sunday, July 22, 2018	Saturday, July 28, 2018	Wednesday, July 25, 2018	Friday, August 03, 2018	(8.50)
31	Sunday, July 29, 2018	Saturday, August 04, 2018	Wednesday, August 01, 2018	Friday, August 10, 2018	(8.50)
32	Sunday, August 05, 2018	Saturday, August 11, 2018	Wednesday, August 08, 2018	Friday, August 17, 2018	(8.50)
33	Sunday, August 12, 2018	Saturday, August 18, 2018	Wednesday, August 15, 2018	Friday, August 24, 2018	(8.50)

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
O&M Expenses - Labor-Related - Regular Payroll - Weekly

Line	Pay Period - Start	Pay Period - End	Pay Period - Midpoint	Pay Date	(Lead)/Lag Days
34	Sunday, August 19, 2018	Saturday, August 25, 2018	Wednesday, August 22, 2018	Friday, August 31, 2018	(8.50)
35	Sunday, August 26, 2018	Saturday, September 01, 2018	Wednesday, August 29, 2018	Friday, September 07, 2018	(8.50)
36	Sunday, September 02, 2018	Saturday, September 08, 2018	Wednesday, September 05, 2018	Friday, September 14, 2018	(8.50)
37	Sunday, September 09, 2018	Saturday, September 15, 2018	Wednesday, September 12, 2018	Friday, September 21, 2018	(8.50)
38	Sunday, September 16, 2018	Saturday, September 22, 2018	Wednesday, September 19, 2018	Friday, September 28, 2018	(8.50)
39	Sunday, September 23, 2018	Saturday, September 29, 2018	Wednesday, September 26, 2018	Friday, October 05, 2018	(8.50)
40	Sunday, September 30, 2018	Saturday, October 06, 2018	Wednesday, October 03, 2018	Friday, October 12, 2018	(8.50)
41	Sunday, October 07, 2018	Saturday, October 13, 2018	Wednesday, October 10, 2018	Friday, October 19, 2018	(8.50)
42	Sunday, October 14, 2018	Saturday, October 20, 2018	Wednesday, October 17, 2018	Friday, October 26, 2018	(8.50)
43	Sunday, October 21, 2018	Saturday, October 27, 2018	Wednesday, October 24, 2018	Friday, November 02, 2018	(8.50)
44	Sunday, October 28, 2018	Saturday, November 03, 2018	Wednesday, October 31, 2018	Friday, November 09, 2018	(8.50)
45	Sunday, November 04, 2018	Saturday, November 10, 2018	Wednesday, November 07, 2018	Friday, November 16, 2018	(8.50)
46	Sunday, November 11, 2018	Saturday, November 17, 2018	Wednesday, November 14, 2018	Friday, November 23, 2018	(8.50)
47	Sunday, November 18, 2018	Saturday, November 24, 2018	Wednesday, November 21, 2018	Friday, November 30, 2018	(8.50)
48	Sunday, November 25, 2018	Saturday, December 01, 2018	Wednesday, November 28, 2018	Friday, December 07, 2018	(8.50)
49	Sunday, December 02, 2018	Saturday, December 08, 2018	Wednesday, December 05, 2018	Friday, December 14, 2018	(8.50)
50	Sunday, December 09, 2018	Saturday, December 15, 2018	Wednesday, December 12, 2018	Friday, December 21, 2018	(8.50)
51	Sunday, December 16, 2018	Saturday, December 22, 2018	Wednesday, December 19, 2018	Friday, December 28, 2018	(8.50)
52	Sunday, December 23, 2018	Saturday, December 29, 2018	Wednesday, December 26, 2018	Friday, January 04, 2019	(8.50)
53				Average	(8.50)

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
O&M Expenses - Labor-Related - Regular Payroll - Bi-Weekly

Line	Pay Period - Start	Pay Period - End	Pay Period - Midpoint	Pay Date	(Lead)/Lag Days
1	Sunday, December 24, 2017	Saturday, January 06, 2018	Sunday, December 31, 2017	Friday, January 12, 2018	(12.00)
2	Sunday, January 07, 2018	Saturday, January 20, 2018	Sunday, January 14, 2018	Friday, January 26, 2018	(12.00)
3	Sunday, January 21, 2018	Saturday, February 03, 2018	Sunday, January 28, 2018	Friday, February 09, 2018	(12.00)
4	Sunday, February 04, 2018	Saturday, February 17, 2018	Sunday, February 11, 2018	Friday, February 23, 2018	(12.00)
5	Sunday, February 18, 2018	Saturday, March 03, 2018	Sunday, February 25, 2018	Friday, March 09, 2018	(12.00)
6	Sunday, March 04, 2018	Saturday, March 17, 2018	Sunday, March 11, 2018	Friday, March 23, 2018	(12.00)
7	Sunday, March 18, 2018	Saturday, March 31, 2018	Sunday, March 25, 2018	Friday, April 06, 2018	(12.00)
8	Sunday, April 01, 2018	Saturday, April 14, 2018	Sunday, April 08, 2018	Friday, April 20, 2018	(12.00)
9	Sunday, April 15, 2018	Saturday, April 28, 2018	Sunday, April 22, 2018	Friday, May 04, 2018	(12.00)
10	Sunday, April 29, 2018	Saturday, May 12, 2018	Sunday, May 06, 2018	Friday, May 18, 2018	(12.00)
11	Sunday, May 13, 2018	Saturday, May 26, 2018	Sunday, May 20, 2018	Friday, June 01, 2018	(12.00)
12	Sunday, May 27, 2018	Saturday, June 09, 2018	Sunday, June 03, 2018	Friday, June 15, 2018	(12.00)
13	Sunday, June 10, 2018	Saturday, June 23, 2018	Sunday, June 17, 2018	Friday, June 29, 2018	(12.00)
14	Sunday, June 24, 2018	Saturday, July 07, 2018	Sunday, July 01, 2018	Friday, July 13, 2018	(12.00)
15	Sunday, July 08, 2018	Saturday, July 21, 2018	Sunday, July 15, 2018	Friday, July 27, 2018	(12.00)
16	Sunday, July 22, 2018	Saturday, August 04, 2018	Sunday, July 29, 2018	Friday, August 10, 2018	(12.00)
17	Sunday, August 05, 2018	Saturday, August 18, 2018	Sunday, August 12, 2018	Friday, August 24, 2018	(12.00)
18	Sunday, August 19, 2018	Saturday, September 01, 2018	Sunday, August 26, 2018	Friday, September 07, 2018	(12.00)
19	Sunday, September 02, 2018	Saturday, September 15, 2018	Sunday, September 09, 2018	Friday, September 21, 2018	(12.00)
20	Sunday, September 16, 2018	Saturday, September 29, 2018	Sunday, September 23, 2018	Friday, October 05, 2018	(12.00)
21	Sunday, September 30, 2018	Saturday, October 13, 2018	Sunday, October 07, 2018	Friday, October 19, 2018	(12.00)
22	Sunday, October 14, 2018	Saturday, October 27, 2018	Sunday, October 21, 2018	Friday, November 02, 2018	(12.00)
23	Sunday, October 28, 2018	Saturday, November 10, 2018	Sunday, November 04, 2018	Friday, November 16, 2018	(12.00)
24	Sunday, November 11, 2018	Saturday, November 24, 2018	Sunday, November 18, 2018	Friday, November 30, 2018	(12.00)
25	Sunday, November 25, 2018	Saturday, December 08, 2018	Sunday, December 02, 2018	Friday, December 14, 2018	(12.00)
26	Sunday, December 09, 2018	Saturday, December 22, 2018	Sunday, December 16, 2018	Friday, December 28, 2018	(12.00)
Average					(12.00)

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
O&M Expenses - Labor-Related - Annual Performance Bonus

Line	Accrual Date	Midpoint	Payout Date	(Lead)/Lag Days
1	1/1/2018	1/16/2018	4/18/2019	(457.00)
2	2/1/2018	2/14/2018	4/18/2019	(427.50)
3	3/1/2018	3/16/2018	4/18/2019	(398.00)
4	4/1/2018	4/15/2018	4/18/2019	(367.50)
5	5/1/2018	5/16/2018	4/18/2019	(337.00)
6	6/1/2018	6/15/2018	4/18/2019	(306.50)
7	7/1/2018	7/16/2018	4/18/2019	(276.00)
8	8/1/2018	8/16/2018	4/18/2019	(245.00)
9	9/1/2018	9/15/2018	4/18/2019	(214.50)
10	10/1/2018	10/16/2018	4/18/2019	(184.00)
11	11/1/2018	11/15/2018	4/18/2019	(153.50)
12	12/1/2018	12/16/2018	4/18/2019	(123.00)
13	1/1/2019			
			Average	(290.79)

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
O&M Expenses - Non-Labor O&M Expenses

Line	Service Period Begin	Service Period End	Midpoint of Service	Invoice Date	Payment Date	Payment Amount	Payment (Lead)/Lag Days	Dollar Days
1				02/13/17	02/21/18	9	(373.00)	(3,316)
2				09/12/17	03/12/18	170	(181.00)	(30,770)
3	6/24/2018	7/27/2018	7/10/2018	07/27/18	08/23/18	134,846	(43.50)	(5,865,801)
4				10/13/17	01/03/18	45	(82.00)	(3,716)
5				10/27/17	03/26/18	1,233	(150.00)	(184,950)
6				10/31/17	01/03/18	10,004	(64.00)	(640,285)
7				11/01/17	12/13/18	5	(407.00)	(2,137)
8				11/03/17	01/18/18	1,498	(76.00)	(113,837)
9				11/08/17	01/19/18	3,729	(72.00)	(268,470)
10				11/09/17	01/03/18	1,238	(55.00)	(68,063)
11				11/20/17	01/02/18	151	(43.00)	(6,485)
12				11/20/17	04/03/18	1,725	(134.00)	(231,150)
13				11/21/17	01/12/18	347	(52.00)	(18,034)
14				11/24/17	01/12/18	35	(49.00)	(1,705)
15				11/29/17	01/03/18	(160)	(35.00)	5,600
16				11/29/17	01/18/18	67	(50.00)	(3,346)
17	10/31/2017	11/2/2017	11/1/2017	12/01/17	03/06/18	\$ 157,269	(125.00)	\$ (19,658,563)
18				12/05/17	03/07/18	9,060	(92.00)	(833,498)
19				12/14/17	01/02/18	21,785	(19.00)	(413,923)
20				12/15/17	01/02/18	800	(18.00)	(14,396)
21				04/05/18	05/01/18	47,344	(26.00)	(1,230,936)
22				12/18/17	02/01/18	4,350	(45.00)	(195,750)
23				12/19/17	01/02/18	6,991	(14.00)	(97,879)
24				12/19/17	01/02/18	496	(14.00)	(6,942)
25				12/20/17	01/19/18	21	(30.00)	(622)
26				12/20/17	08/02/18	361	(225.00)	(81,218)
27				12/28/17	02/13/18	760	(47.00)	(35,720)
28				12/28/17	03/07/18	90	(69.00)	(6,205)
29				12/29/17	01/12/18	2,000	(14.00)	(28,000)
30				12/31/17	01/16/18	293	(16.00)	(4,694)
31	11/26/2017	12/23/2017	12/9/2017	12/31/17	03/02/18	55,774	(82.50)	(4,601,381)
32				01/01/18	02/12/18	470	(42.00)	(19,757)
33				01/02/18	03/29/18	12	(86.00)	(1,035)
34				01/06/18	02/13/18	54	(38.00)	(2,045)
35				01/09/18	01/26/18	208	(17.00)	(3,529)
36				01/11/18	02/06/18	292	(26.00)	(7,595)
37				01/11/18	02/09/18	5	(29.00)	(152)
38				01/19/18	01/26/18	15,207	(7.00)	(106,446)
39				01/20/18	02/01/18	19	(12.00)	(223)
40				01/22/18	02/06/18	425	(15.00)	(6,375)
41				01/25/18	06/15/18	3,750	(141.00)	(528,750)
42				01/29/18	02/23/18	1,175	(25.00)	(29,385)
43				01/31/18	03/09/18	695	(37.00)	(25,715)
44				01/31/18	03/26/18	1,178	(54.00)	(63,591)
45				01/31/18	05/15/18	4,724	(104.00)	(491,296)
46	12/24/2017	12/31/2017	12/27/2017	02/02/18	03/06/18	119,071	(68.50)	(8,156,394)
47				02/05/18	03/07/18	145	(30.00)	(4,355)
48				02/06/18	03/09/18	701	(31.00)	(21,739)
49				02/12/18	03/07/18	717	(23.00)	(16,491)
50				02/16/18	03/07/18	1,485	(19.00)	(28,220)
51				02/17/18	03/26/18	80	(37.00)	(2,974)
52				02/20/18	04/18/18	619	(57.00)	(35,294)
53				02/23/18	03/21/18	43,509	(26.00)	(1,131,234)
54				02/28/18	03/05/18	3,560	(5.00)	(17,801)
55				02/28/18	03/12/18	204	(12.00)	(2,453)
56				02/28/18	03/26/18	242	(26.00)	(6,287)
57				03/01/18	03/20/18	24	(19.00)	(462)
58	2/6/2018	2/28/2018	2/17/2018	03/01/18	03/26/18	77,531	(37.00)	(2,868,652)
59				03/01/18	03/26/18	269	(25.00)	(6,725)
60				03/02/18	05/14/18	(0)	(73.00)	1
61				03/03/18	06/01/18	176	(90.00)	(15,815)
62				03/03/18	06/08/18	27	(97.00)	(2,631)
63				03/09/18	04/13/18	21	(35.00)	(718)
64				03/09/18	04/30/18	265	(52.00)	(13,780)
65				03/11/18	03/30/18	69	(19.00)	(1,305)

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
O&M Expenses - Non-Labor O&M Expenses

Line	Service Period Begin	Service Period End	Midpoint of Service	Invoice Date	Payment Date	Payment Amount	Payment (Lead)/Lag Days	Dollar Days
66				03/15/18	04/12/18	3,285	(28.00)	(91,988)
67				03/16/18	03/28/18	7,421	(12.00)	(89,053)
68				03/16/18	04/23/18	4,880	(38.00)	(185,432)
69				03/23/18	04/20/18	2,875	(28.00)	(80,487)
70				03/27/18	04/18/18	270	(22.00)	(5,940)
71				03/27/18	05/14/18	400	(48.00)	(19,200)
72				04/01/18	07/26/18	114	(116.00)	(13,197)
73				04/01/18	08/02/18	5	(123.00)	(646)
74				04/03/18	04/04/18	702	(1.00)	(702)
75				04/04/18	05/04/18	2	(30.00)	(71)
76				04/05/18	04/19/18	5,428	(14.00)	(75,996)
77				04/07/18	05/04/18	200	(27.00)	(5,389)
78				04/09/18	05/04/18	4,485	(25.00)	(112,113)
79				04/10/18	05/04/18	15	(24.00)	(350)
80				04/12/18	05/14/18	1,856	(32.00)	(59,392)
81				04/20/18	05/04/18	493	(14.00)	(6,899)
82				04/20/18	05/21/18	3,927	(31.00)	(121,732)
83				04/20/18	05/25/18	19,564	(35.00)	(684,745)
84				04/23/18	05/18/18	360	(25.00)	(9,000)
85				04/24/18	05/24/18	3,559	(30.00)	(106,780)
86				04/24/18	05/24/18	51	(30.00)	(1,530)
87				04/28/18	04/30/18	9	(2.00)	(18)
88				04/30/18	03/27/18	2,537	34.00	86,259
89				04/30/18	06/15/18	220	(46.00)	(10,120)
90				05/01/18	05/18/18	5,007	(17.00)	(85,115)
91				05/04/18	05/11/18	2,834	(7.00)	(19,837)
92				05/04/18	05/25/18	4,226	(21.00)	(88,750)
93				05/04/18	06/01/18	36	(28.00)	(1,016)
94				05/04/18	06/08/18	2	(35.00)	(65)
95				05/04/18	06/15/18	6	(42.00)	(234)
96				05/08/18	09/10/18	1,165	(125.00)	(145,649)
97				05/11/18	06/08/18	4,013	(28.00)	(112,354)
98				05/11/18	06/29/18	3,240	(49.00)	(158,760)
99				05/12/18	06/01/18	19	(20.00)	(389)
100				05/14/18	05/18/18	37	(4.00)	(147)
101				05/14/18	06/01/18	385	(18.00)	(6,930)
102				05/14/18	09/12/18	330	(121.00)	(39,930)
103				05/17/18	06/01/18	1,710	(15.00)	(25,652)
104				05/22/18	06/15/18	955	(24.00)	(22,928)
105				05/23/18	06/26/18	1,583	(34.00)	(53,834)
106				05/24/18	06/01/18	2,003	(8.00)	(16,023)
107				05/24/18	08/01/18	10,119	(69.00)	(698,194)
108				05/25/18	06/01/18	30	(7.00)	(212)
109				05/30/18	06/29/18	(12)	(30.00)	360
110				05/31/18	06/15/18	8,304	(15.00)	(124,564)
111				06/01/18	06/28/18	2,339	(27.00)	(63,141)
112				06/02/18	06/28/18	87	(26.00)	(2,253)
113				06/04/18	06/15/18	15	(11.00)	(166)
114				06/06/18	07/05/18	570	(29.00)	(16,530)
115				06/08/18	06/27/18	872	(19.00)	(16,560)
116				06/25/18	07/02/18	809	(7.00)	(5,665)
117				06/25/18	07/16/18	539	(21.00)	(11,309)
118				06/25/18	07/16/18	52	(21.00)	(1,092)
119				06/27/18	08/02/18	5	(36.00)	(162)
120				06/28/18	08/02/18	380	(35.00)	(13,300)
121				06/30/18	08/03/18	384	(34.00)	(13,056)
122				07/02/18	08/02/18	668	(31.00)	(20,693)
123				07/03/18	07/16/18	14,328	(13.00)	(186,268)
124				07/03/18	07/19/18	3,752	(16.00)	(60,039)
125	11/4/2017	12/29/2017	12/1/2017	12/15/17	01/31/18	97,291	(60.50)	(5,886,112)
126				07/10/18	07/19/18	132	(9.00)	(1,188)
127				07/11/18	08/10/18	36	(30.00)	(1,086)
128				07/12/18	07/19/18	14,117	(7.00)	(98,817)
129				07/12/18	08/09/18	94	(28.00)	(2,632)
130				07/13/18	08/09/18	92	(27.00)	(2,483)
131				07/18/18	10/03/18	22	(77.00)	(1,693)

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
O&M Expenses - Non-Labor O&M Expenses

Line	Service Period Begin	Service Period End	Midpoint of Service	Invoice Date	Payment Date	Payment Amount	Payment (Lead)/Lag Days	Dollar Days
132				07/20/18	07/26/18	4,490	(6.00)	(26,939)
133				07/23/18	07/31/18	229	(8.00)	(1,829)
134				07/24/18	08/14/18	58	(21.00)	(1,226)
135				07/26/18	08/16/18	3	(21.00)	(56)
136				07/27/18	08/30/18	381	(34.00)	(12,967)
137				07/28/18	07/03/18	87	25.00	2,179
138				07/30/18	08/09/18	21,398	(10.00)	(213,979)
139				07/30/18	08/23/18	672	(24.00)	(16,126)
140				07/31/18	08/17/18	256	(17.00)	(4,352)
141				07/31/18	08/31/18	131	(31.00)	(4,057)
142				08/01/18	09/07/18	113	(37.00)	(4,163)
143				08/02/18	08/09/18	397	(7.00)	(2,779)
144				08/02/18	10/03/18	160	(62.00)	(9,942)
145				08/07/18	08/16/18	2	(9.00)	(20)
146				08/10/18	08/16/18	1,915	(6.00)	(11,489)
147				08/10/18	08/28/18	11,850	(18.00)	(213,292)
148				08/14/18	11/29/18	40	(107.00)	(4,280)
149				08/15/18	09/12/18	424	(28.00)	(11,875)
150				08/16/18	08/29/18	12,714	(13.00)	(165,288)
151				08/17/18	08/30/18	4,447	(13.00)	(57,811)
152				08/20/18	09/13/18	128	(24.00)	(3,067)
153				08/21/18	08/30/18	38	(9.00)	(345)
154				08/22/18	09/11/18	4,237	(20.00)	(84,733)
155				08/23/18	08/30/18	3	(7.00)	(21)
156				08/24/18	09/24/18	31	(31.00)	(955)
157				08/24/18	10/16/18	7,725	(53.00)	(409,445)
158				08/24/18	10/16/18	1,406	(53.00)	(74,509)
159				08/29/18	10/03/18	900	(35.00)	(31,500)
160				08/30/18	09/11/18	498	(12.00)	(5,971)
161				09/01/18	09/27/18	224	(26.00)	(5,824)
162				09/04/18	09/13/18	435	(9.00)	(3,915)
163				09/04/18	09/26/18	400	(22.00)	(8,800)
164				09/06/18	10/04/18	3,450	(28.00)	(96,600)
165				09/12/18	10/03/18	3,615	(21.00)	(75,918)
166				09/13/18	10/10/18	540	(27.00)	(14,573)
167				09/14/18	10/10/18	1,025	(26.00)	(26,650)
168				09/16/18	09/27/18	2,227	(11.00)	(24,497)
169				09/17/18	09/26/18	41	(9.00)	(369)
170				09/19/18	10/04/18	200	(15.00)	(3,000)
171				09/20/18	09/28/18	15	(8.00)	(122)
172				09/20/18	11/02/18	275	(43.00)	(11,825)
173				09/21/18	10/24/18	1,786	(33.00)	(58,934)
174				09/21/18	11/02/18	(5)	(42.00)	221
175				09/26/18	10/05/18	43	(9.00)	(385)
176				09/27/18	10/09/18	391	(12.00)	(4,695)
177				10/02/18	10/05/18	7	(3.00)	(20)
178				10/03/18	10/05/18	372	(2.00)	(744)
179	10/1/2018	12/31/2018	11/15/2018	10/04/18	10/05/18	136,094	41.50	5,647,901
180				10/04/18	10/12/18	4,210	(8.00)	(33,681)
181				10/04/18	11/02/18	1,873	(29.00)	(54,317)
182				10/05/18	11/02/18	440	(28.00)	(12,324)
183	9/1/2018	9/30/2018	9/15/2018	10/10/18	10/10/18	89,839	(24.50)	(2,201,066)
184				10/10/18	11/09/18	2,575	(30.00)	(77,250)
185				10/15/18	11/02/18	4,463	(18.00)	(80,325)
186				10/15/18	11/26/18	261	(42.00)	(10,962)
187				10/19/18	10/22/18	1,066	(3.00)	(3,197)
188				10/24/18	11/02/18	933	(9.00)	(8,401)
189				10/26/18	11/02/18	954	(7.00)	(6,679)
190				10/28/18	11/15/18	2,863	(18.00)	(51,541)
191				10/31/18	11/28/18	3,576	(28.00)	(100,120)
192				10/31/18	12/07/18	1,700	(37.00)	(62,900)
193				10/31/18	12/13/18	1,275	(43.00)	(54,825)
194				11/08/18	12/07/18	118	(29.00)	(3,432)
195				11/09/18	12/06/18	3,840	(27.00)	(103,680)
196				11/16/18	12/06/18	380	(20.00)	(7,600)
197				11/23/18	12/20/18	380	(27.00)	(10,260)

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
O&M Expenses - Non-Labor O&M Expenses

Line	Service Period Begin	Service Period End	Midpoint of Service	Invoice Date	Payment Date	Payment Amount	Payment (Lead)/Lag Days	Dollar Days
198				11/26/18	11/26/18	45	0.00	-
199				11/26/18	12/04/18	16,498	(8.00)	(131,981)
200				11/28/18	12/07/18	1	(9.00)	(7)
201								
202					Total	\$ 1,347,653	(42.25)	\$ (56,938,528)
203								

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
Income Tax

Federal Income Tax

Line	Quarter	Service Period		Midpoint of Service Period	Payment Date	Percent of Taxes Due	(Lead)/Lag Days	
		Start	End				Days from Midpoint to Payment Date	(Lead)/Lag Days
1	First Quarter	1/1/2018	12/31/2018	7/2/2018	4/15/2018	25.00%	78.50	19.63
2	Second Quarter	1/1/2018	12/31/2018	7/2/2018	6/15/2018	25.00%	17.50	4.38
3	Third Quarter	1/1/2018	12/31/2018	7/2/2018	9/15/2018	25.00%	(74.50)	(18.63)
4	Fourth Quarter	1/1/2018	12/31/2018	7/2/2018	12/15/2018	25.00%	(165.50)	(41.38)
5	<u>Federal Income Tax (Lead)/Lag Days</u>							<u>(36.00)</u>

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
Taxes Other Than Income Tax

Line	Description	Amount	(Lead)/Lag Days	Dollar Days	Composite (Lead)/Lag Days
	Payroll Taxes				
1	FICA	\$ 570,470	(16.09)	\$ (9,178,289)	
2	Federal Unemployment	4,922	(30.75)	(151,345)	
3	State Unemployment	18,928	(103.04)	(1,950,353)	
4	Total Payroll Taxes	\$ 594,320		\$ (11,279,987)	(18.98)
5	Property Taxes	\$ 4,849,638	17.46	84,698,643	17.46

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
FICA

Line	Pay-Period End	Payment Date	Amount	(Lead)/Lag Days	Dollar Days
1	12/30/2017	1/5/2018	\$ 5,957	(6.00)	\$ (35,742)
2	1/6/2018	1/12/2018	\$ 17,570	(6.00)	(105,421)
3	1/13/2018	1/19/2018	\$ 5,787	(6.00)	(34,724)
4	1/20/2018	1/26/2018	\$ 17,512	(6.00)	(105,073)
5	1/27/2018	2/2/2018	\$ 5,351	(6.00)	(32,107)
6	2/3/2018	2/9/2018	\$ 16,789	(6.00)	(100,734)
7	2/10/2018	2/16/2018	\$ 5,566	(6.00)	(33,395)
8	2/17/2018	2/23/2018	\$ 16,313	(6.00)	(97,879)
9	2/24/2018	3/2/2018	\$ 5,596	(6.00)	(33,579)
10	3/3/2018	3/9/2018	\$ 16,562	(6.00)	(99,372)
11	3/10/2018	3/16/2018	\$ 7,467	(6.00)	(44,801)
12	3/17/2018	3/23/2018	\$ 19,921	(6.00)	(119,528)
13	3/24/2018	3/30/2018	\$ 5,355	(6.00)	(32,128)
14	3/31/2018	4/6/2018	\$ 16,324	(6.00)	(97,945)
15	4/7/2018	4/13/2018	\$ 5,634	(6.00)	(33,803)
16	4/14/2018	4/20/2018	\$ 54,068	(6.00)	(324,409)
17	4/21/2018	4/27/2018	\$ 5,738	(6.00)	(34,429)
18	4/28/2018	5/4/2018	\$ 16,651	(6.00)	(99,904)
19	5/5/2018	5/11/2018	\$ 6,092	(6.00)	(36,555)
20	5/12/2018	5/18/2018	\$ 16,797	(6.00)	(100,780)
21	5/19/2018	5/25/2018	\$ 5,979	(6.00)	(35,874)
22	5/26/2018	6/1/2018	\$ 16,710	(6.00)	(100,259)
23	6/2/2018	6/8/2018	\$ 5,805	(6.00)	(34,829)
24	6/9/2018	6/15/2018	\$ 16,437	(6.00)	(98,624)
25	6/16/2018	6/22/2018	\$ 5,673	(6.00)	(34,039)
26	6/23/2018	6/29/2018	\$ 16,126	(6.00)	(96,756)
27	6/30/2018	7/6/2018	\$ 5,624	(6.00)	(33,744)
28	7/7/2018	7/13/2018	\$ 15,521	(6.00)	(93,126)
29	7/14/2018	7/20/2018	\$ 5,719	(6.00)	(34,315)
30	7/21/2018	7/27/2018	\$ 13,176	(6.00)	(79,058)
31	7/28/2018	8/3/2018	\$ 5,655	(6.00)	(33,929)
32	8/4/2018	8/10/2018	\$ 13,517	(6.00)	(81,104)
33	8/11/2018	8/17/2018	\$ 5,809	(6.00)	(34,855)
34	8/18/2018	8/24/2018	\$ 13,443	(6.00)	(80,658)
35	8/25/2018	8/31/2018	\$ 5,262	(6.00)	(31,572)
36	9/1/2018	9/7/2018	\$ 12,867	(6.00)	(77,199)
37	9/8/2018	9/14/2018	\$ 5,403	(6.00)	(32,417)
38	9/15/2018	9/21/2018	\$ 13,002	(6.00)	(78,011)
39	9/22/2018	9/28/2018	\$ 5,969	(6.00)	(35,816)
40	9/29/2018	10/5/2018	\$ 12,682	(6.00)	(76,092)
41	10/6/2018	10/12/2018	\$ 4,903	(6.00)	(29,417)
42	10/13/2018	10/19/2018	\$ 12,667	(6.00)	(76,004)
43	10/20/2018	10/26/2018	\$ 5,857	(6.00)	(35,143)
44	10/27/2018	11/2/2018	\$ 12,460	(6.00)	(74,759)
45	11/3/2018	11/9/2018	\$ 5,483	(6.00)	(32,899)
46	11/10/2018	11/16/2018	\$ 12,818	(6.00)	(76,905)
47	11/17/2018	11/23/2018	\$ 5,885	(6.00)	(35,310)
48	11/24/2018	11/30/2018	\$ 12,509	(6.00)	(75,052)
49	12/1/2018	12/7/2018	\$ 5,785	(6.00)	(34,708)
50	12/8/2018	12/14/2018	\$ 11,748	(6.00)	(70,486)
51	12/15/2018	12/21/2018	\$ 5,087	(6.00)	(30,523)
52	12/22/2018	12/28/2018	\$ 7,838	(6.00)	(47,028)
Total			\$ 570,470	(6.00)	\$ (3,422,819)
53	Payroll Lag			(10.09)	
54	Total (Lead)/Lag Days			(16.09)	

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
Federal Unemployment

Line	Description	Liability Date	Amount	Payment Date	(Lead)/Lag Days
1	First Quarter	3/31/2018	\$ 4,338	4/30/2018	(30.00)
2	Second Quarter	6/30/2018	\$ 230	7/31/2018	(31.00)
3	Third Quarter	9/30/2018	\$ 110	10/31/2018	(31.00)
4	Fourth Quarter	12/31/2018	\$ 244	1/31/2019	(31.00)
5	Total		\$ 4,922		(30.75)

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
State Unemployment

Line	Pay-Period End	Payment Date	GSE Amount	(Lead)/Lag Days	Dollar Days
1	12/30/2017	4/30/2018	\$ 1,196	(121.00)	\$ (144,750)
2	1/6/2018	4/30/2018	\$ 3,546	(114.00)	(404,212)
3	1/13/2018	4/30/2018	\$ 1,161	(107.00)	(124,225)
4	1/20/2018	4/30/2018	\$ 3,424	(100.00)	(342,449)
5	1/27/2018	4/30/2018	\$ 941	(93.00)	(87,516)
6	2/3/2018	4/30/2018	\$ 2,733	(86.00)	(235,037)
7	2/10/2018	4/30/2018	\$ 592	(79.00)	(46,740)
8	2/17/2018	4/30/2018	\$ 1,490	(72.00)	(107,314)
9	2/24/2018	4/30/2018	\$ 294	(65.00)	(19,117)
10	3/3/2018	4/30/2018	\$ 655	(58.00)	(37,992)
11	3/10/2018	4/30/2018	\$ 168	(51.00)	(8,557)
12	3/17/2018	4/30/2018	\$ 372	(44.00)	(16,364)
13	3/24/2018	4/30/2018	\$ 113	(37.00)	(4,169)
14	3/31/2018	7/31/2018	\$ 207	(122.00)	(25,237)
15	4/7/2018	7/31/2018	\$ 101	(115.00)	(11,624)
16	4/14/2018	7/31/2018	\$ 241	(108.00)	(25,993)
17	4/21/2018	7/31/2018	\$ 59	(101.00)	(5,951)
18	4/28/2018	7/31/2018	\$ 83	(94.00)	(7,787)
19	5/5/2018	7/31/2018	\$ 81	(87.00)	(7,043)
20	5/12/2018	7/31/2018	\$ 103	(80.00)	(8,258)
21	5/19/2018	7/31/2018	\$ 58	(73.00)	(4,265)
22	5/26/2018	7/31/2018	\$ 69	(66.00)	(4,536)
23	6/2/2018	7/31/2018	\$ 62	(59.00)	(3,672)
24	6/9/2018	7/31/2018	\$ 91	(52.00)	(4,757)
25	6/16/2018	7/31/2018	\$ 42	(45.00)	(1,877)
26	6/23/2018	7/31/2018	\$ 83	(38.00)	(3,159)
27	6/30/2018	7/31/2018	\$ 24	(31.00)	(741)
28	7/7/2018	7/31/2018	\$ 47	(24.00)	(1,119)
29	7/14/2018	10/31/2018	\$ 21	(109.00)	(2,279)
30	7/21/2018	10/31/2018	\$ 76	(102.00)	(7,722)

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
State Unemployment

Line	Pay-Period End	Payment Date	GSE Amount	(Lead)/Lag Days	Dollar Days
31	7/28/2018	10/31/2018	\$ 17	(95.00)	(1,617)
32	8/4/2018	10/31/2018	\$ 63	(88.00)	(5,544)
33	8/11/2018	10/31/2018	\$ 19	(81.00)	(1,537)
34	8/18/2018	10/31/2018	\$ 54	(74.00)	(4,005)
35	8/25/2018	10/31/2018	\$ 14	(67.00)	(963)
36	9/1/2018	10/31/2018	\$ 49	(60.00)	(2,936)
37	9/8/2018	10/31/2018	\$ 10	(53.00)	(534)
38	9/15/2018	10/31/2018	\$ 51	(46.00)	(2,328)
39	9/22/2018	10/31/2018	\$ 33	(39.00)	(1,291)
40	9/29/2018	10/31/2018	\$ 70	(32.00)	(2,247)
41	10/6/2018	10/31/2018	\$ 29	(25.00)	(737)
42	10/13/2018	10/31/2018	\$ 84	(18.00)	(1,504)
43	10/20/2018	1/31/2019	\$ 43	(103.00)	(4,413)
44	10/27/2018	1/31/2019	\$ 89	(96.00)	(8,555)
45	11/3/2018	1/31/2019	\$ 41	(89.00)	(3,628)
46	11/10/2018	1/31/2019	\$ 82	(82.00)	(6,713)
47	11/17/2018	1/31/2019	\$ 41	(75.00)	(3,077)
48	11/24/2018	1/31/2019	\$ 73	(68.00)	(4,975)
49	12/1/2018	1/31/2019	\$ 36	(61.00)	(2,195)
50	12/8/2018	1/31/2019	\$ 93	(54.00)	(4,999)
51	12/15/2018	1/31/2019	\$ (154)	(47.00)	7,252
52	12/22/2018	1/31/2019	\$ (41)	(40.00)	1,622
53	Total		\$ 18,928	(92.95)	\$ (1,759,384)
54	Payroll Lag			(10.09)	
55	Total (Lead)/Lag Days			(103.04)	

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
Property Taxes

Line	Description	Tax Period Start	Tax Period End	Midpoint of Tax Period	Payment Date	Tax Amount	Days from Midpoint to End of Period	(Lead)/Lag Days Payment (Lead)/Lag Days	Total (Lead)/Lag Days	Weighted Dollar- Days	Composite (Lead)/Lag Days
1	TOWN OF ACWORTH	4/1/2018	9/30/2018	7/1/2018	6/21/2018	\$ 11,608	(90.50)	101.00	10.50	\$ 121,884	
2	TOWN OF ACWORTH	10/1/2018	3/31/2019	12/31/2018	11/29/2018	11,913	(90.00)	122.00	32.00	381,216	
3	TOWN OF ALSTEAD	4/1/2018	9/30/2018	7/1/2018	6/21/2018	41,103	(90.50)	101.00	10.50	431,582	
4	TOWN OF ALSTEAD	10/1/2018	3/31/2019	12/31/2018	11/29/2018	46,482	(90.00)	122.00	32.00	1,487,424	
5	TOWN OF BATH NH	4/1/2018	9/30/2018	7/1/2018	6/11/2018	1,117	(90.50)	111.00	20.50	22,899	
6	TOWN OF BATH NH	10/1/2018	3/31/2019	12/31/2018	11/19/2018	748	(90.00)	132.00	42.00	31,416	
7	TOWN OF CANAAN	4/1/2018	9/30/2018	7/1/2018	6/13/2018	69,705	(90.50)	109.00	18.50	1,289,543	
8	TOWN OF CANAAN	10/1/2018	3/31/2019	12/31/2018	11/29/2018	63,933	(90.00)	122.00	32.00	2,045,856	
9	TOWN OF CHARLESTOWN NH	4/1/2018	9/30/2018	7/1/2018	6/29/2018	941	(90.50)	93.00	2.50	2,353	
10	TOWN OF CHARLESTOWN NH	10/1/2018	3/31/2019	12/31/2018	12/3/2018	1,003	(90.00)	118.00	28.00	28,084	
11	TOWN OF CHARLESTOWN NH	4/1/2018	9/30/2018	7/1/2018	6/29/2018	6	(90.50)	93.00	2.50	15	
12	TOWN OF CHARLESTOWN NH	10/1/2018	3/31/2019	12/31/2018	12/3/2018	9	(90.00)	118.00	28.00	252	
13	TOWN OF CHARLESTOWN NH	4/1/2018	9/30/2018	7/1/2018	6/29/2018	1,872	(90.50)	93.00	2.50	4,680	
14	TOWN OF CHARLESTOWN NH	10/1/2018	3/31/2019	12/31/2018	12/3/2018	1,985	(90.00)	118.00	28.00	55,580	
15	TOWN OF CHARLESTOWN NH	4/1/2018	9/30/2018	7/1/2018	6/29/2018	7,642	(90.50)	93.00	2.50	19,105	
16	TOWN OF CHARLESTOWN NH	10/1/2018	3/31/2019	12/31/2018	12/20/2018	7,218	(90.00)	101.00	11.00	79,398	
17	TOWN OF CHARLESTOWN NH	4/1/2018	9/30/2018	7/1/2018	6/29/2018	157,688	(90.50)	93.00	2.50	394,220	
18	TOWN OF CHARLESTOWN NH	10/1/2018	3/31/2019	12/31/2018	12/11/2018	167,256	(90.00)	110.00	20.00	3,345,120	
19	TOWN OF CORNISH	4/1/2018	9/30/2018	7/1/2018	6/21/2018	2,181	(90.50)	101.00	10.50	22,901	
20	TOWN OF CORNISH	10/1/2018	3/31/2019	12/31/2018	11/19/2018	2,318	(90.00)	132.00	42.00	97,356	
21	TOWN OF DERRY	4/1/2018	9/30/2018	7/1/2018	6/11/2018	2,106	(90.50)	111.00	20.50	43,173	
22	TOWN OF DERRY	10/1/2018	3/31/2019	12/31/2018	12/3/2018	2,706	(90.00)	118.00	28.00	75,768	
23	TOWN OF ENFIELD, NH	4/1/2018	9/30/2018	7/1/2018	6/21/2018	967	(90.50)	101.00	10.50	10,154	
24	TOWN OF ENFIELD, NH	10/1/2018	3/31/2019	12/31/2018	11/19/2018	1,015	(90.00)	132.00	42.00	42,630	
25	TOWN OF ENFIELD, NH	4/1/2018	9/30/2018	7/1/2018	6/21/2018	85,489	(90.50)	101.00	10.50	897,635	
26	TOWN OF ENFIELD, NH	10/1/2018	3/31/2019	12/31/2018	11/19/2018	85,859	(90.00)	132.00	42.00	3,606,078	
27	TOWN OF FRANCONIA, NH	10/1/2018	3/31/2019	12/31/2018	11/9/2019	130	(90.00)	(223.00)	(313.00)	(40,690)	
28	TOWN OF GRAFTON	4/1/2018	9/30/2018	7/1/2018	6/6/2018	844	(90.50)	116.00	25.50	21,522	
29	TOWN OF GRAFTON	10/1/2018	3/31/2019	12/31/2018	11/19/2018	900	(90.00)	132.00	42.00	37,800	
30	TOWN OF HANOVER NH	4/1/2018	9/30/2018	7/1/2018	6/11/2018	97,446	(90.50)	111.00	20.50	1,997,643	
31	TOWN OF HANOVER NH	10/1/2018	3/31/2019	12/31/2018	11/19/2018	96,767	(90.00)	132.00	42.00	4,064,214	
32	TOWN OF HANOVER NH	10/1/2018	3/31/2019	12/31/2018	11/19/2018	5,093	(90.00)	132.00	42.00	213,906	
33	TOWN OF LANGDON	4/1/2018	9/30/2018	7/1/2018	6/21/2018	19,320	(90.50)	101.00	10.50	202,860	
34	TOWN OF LANGDON	10/1/2018	3/31/2019	12/31/2018	12/20/2018	15,908	(90.00)	101.00	11.00	174,988	
35	CITY OF LEBANON	4/1/2018	9/30/2018	7/1/2018	6/11/2018	754	(90.50)	111.00	20.50	15,457	
36	CITY OF LEBANON	10/1/2018	3/31/2019	12/31/2018	11/19/2018	793	(90.00)	132.00	42.00	15,005,718	
37	CITY OF LEBANON	4/1/2018	9/30/2018	7/1/2018	6/11/2018	357,279	(90.50)	111.00	20.50	1,046	
38	CITY OF LEBANON	10/1/2018	3/31/2019	12/31/2018	11/19/2018	375,211	(90.00)	132.00	42.00	125,622	
39	CITY OF LEBANON	4/1/2018	9/30/2018	7/1/2018	6/11/2018	51	(90.50)	111.00	20.50	1,073,667	
40	CITY OF LEBANON	10/1/2018	3/31/2019	12/31/2018	11/19/2018	55	(90.00)	132.00	42.00	80,388	
41	CITY OF LEBANON	4/1/2018	9/30/2018	7/1/2018	6/11/2018	2,991	(90.50)	111.00	20.50	41,226	
42	CITY OF LEBANON	10/1/2018	3/31/2019	12/31/2018	11/19/2018	3,142	(90.00)	132.00	42.00	355,446	
43	CITY OF LEBANON	4/1/2018	9/30/2018	7/1/2018	6/11/2018	52,374	(90.50)	111.00	20.50	176,167	
44	CITY OF LEBANON	10/1/2018	3/31/2019	12/31/2018	11/19/2018	54,680	(90.00)	132.00	42.00	16,233	
45	CITY OF LEBANON	4/1/2018	9/30/2018	7/1/2018	6/11/2018	1,914	(90.50)	111.00	20.50	8,727	
46	CITY OF LEBANON	10/1/2018	3/31/2019	12/31/2018	11/19/2018	2,011	(90.00)	132.00	42.00	84,462	
47	TOWN OF LONDONDERRY	4/1/2018	9/30/2018	7/1/2018	6/11/2018	8,463	(90.50)	111.00	20.50	173,492	
48	TOWN OF LONDONDERRY	10/1/2018	3/31/2019	12/31/2018	11/19/2018	8,594	(90.00)	132.00	42.00	360,927	
49	TOWN OF MARLOW NH	4/1/2018	9/30/2018	7/1/2018	6/21/2018	387	(90.50)	101.00	10.50	4,058	
50	TOWN OF MARLOW NH	10/1/2018	3/31/2019	12/31/2018	12/3/2018	426	(90.00)	118.00	28.00	11,920	

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Lead-Lag Study
Property Taxes

Line	Description	Tax Period Start	Tax Period End	Midpoint of Tax Period	Payment Date	Tax Amount	Days from Midpoint to End of Period	(Lead)/Lag Days Payment (Lead)/Lag Days	Total (Lead)/Lag Days	Weighted Dollar- Days	Composite (Lead)/Lag Days
51	TOWN OF MONROE	4/1/2018	9/30/2018	7/1/2018	6/6/2018	3,059	(90.50)	116.00	25.50	78,002	
52	TOWN OF MONROE	10/1/2018	3/31/2019	12/31/2018	12/11/2018	4,978	(90.00)	110.00	20.00	99,550	
53	STATE OF NH - DEPARTMENT OF REVENUE	1/1/2018	3/31/2018	2/15/2018	3/27/2018	220,793	(44.00)	4.00	(40.00)	(8,831,720)	
54	STATE OF NH - DEPARTMENT OF REVENUE	4/1/2018	6/30/2018	5/16/2018	6/6/2018	220,793	(44.50)	24.00	(20.50)	(4,526,257)	
55	STATE OF NH - DEPARTMENT OF REVENUE	7/1/2018	9/30/2018	8/16/2018	9/5/2018	220,793	(45.00)	25.00	(20.00)	(4,415,860)	
56	STATE OF NH - DEPARTMENT OF REVENUE	10/1/2018	12/31/2018	11/16/2018	11/27/2018	220,793	(45.00)	34.00	(11.00)	(2,428,723)	
57	STATE OF NH - DEPARTMENT OF REVENUE	1/1/2018	12/31/2018	7/2/2018	12/31/2018	79,667	(181.50)	-	(181.50)	(14,459,561)	
58	TOWN OF ORANGE NH	10/1/2018	3/31/2019	12/31/2018	11/19/2018	2,001	(90.00)	132.00	42.00	84,047	
59	TOWN OF PELHAM	4/1/2018	9/30/2018	7/1/2018	6/6/2018	101,168	(90.50)	116.00	25.50	2,579,784	
60	TOWN OF PELHAM	10/1/2018	3/31/2019	12/31/2018	11/19/2018	166,841	(90.00)	132.00	42.00	7,007,322	
61	TOWN OF PELHAM	10/1/2018	3/31/2019	12/31/2018	11/19/2018	2,551	(90.00)	132.00	42.00	107,142	
62	TOWN OF PLAINFIELD	1/1/2018	3/31/2018	2/15/2018	6/13/2018	24,321	(44.00)	(74.00)	(118.00)	(2,869,878)	
63	TOWN OF PLAINFIELD	4/1/2018	6/30/2018	5/16/2018	11/19/2018	29,005	(44.50)	(142.00)	(186.50)	(5,409,433)	
64	TOWN OF SALEM TAX COLLECTOR	4/1/2018	9/30/2018	7/1/2018	6/11/2018	1,466	(90.50)	111.00	20.50	30,053	
65	TOWN OF SALEM TAX COLLECTOR	10/1/2018	3/31/2019	12/31/2018	11/19/2018	1,582	(90.00)	132.00	42.00	66,444	
66	TOWN OF SALEM TAX COLLECTOR	4/1/2018	9/30/2018	7/1/2018	6/11/2018	862	(90.50)	111.00	20.50	17,671	
67	TOWN OF SALEM TAX COLLECTOR	10/1/2018	3/31/2019	12/31/2018	11/19/2018	925	(90.00)	132.00	42.00	38,850	
68	TOWN OF SALEM TAX COLLECTOR	4/1/2018	9/30/2018	7/1/2018	6/11/2018	152	(90.50)	111.00	20.50	3,116	
69	TOWN OF SALEM TAX COLLECTOR	10/1/2018	3/31/2019	12/31/2018	11/19/2018	164	(90.00)	132.00	42.00	6,888	
70	TOWN OF SALEM TAX COLLECTOR	4/1/2018	9/30/2018	7/1/2018	6/11/2018	283	(90.50)	111.00	20.50	5,802	
71	TOWN OF SALEM TAX COLLECTOR	10/1/2018	3/31/2019	12/31/2018	11/19/2018	305	(90.00)	132.00	42.00	12,810	
72	TOWN OF SALEM TAX COLLECTOR	4/1/2018	9/30/2018	7/1/2018	6/11/2018	1,504	(90.50)	111.00	20.50	30,832	
73	TOWN OF SALEM TAX COLLECTOR	10/1/2018	3/31/2019	12/31/2018	11/19/2018	1,625	(90.00)	132.00	42.00	68,250	
74	TOWN OF SALEM TAX COLLECTOR	4/1/2018	9/30/2018	7/1/2018	6/11/2018	240	(90.50)	111.00	20.50	4,920	
75	TOWN OF SALEM TAX COLLECTOR	10/1/2018	3/31/2019	12/31/2018	11/19/2018	261	(90.00)	132.00	42.00	10,962	
76	TOWN OF SALEM TAX COLLECTOR	4/1/2018	9/30/2018	7/1/2018	6/11/2018	976	(90.50)	111.00	20.50	20,008	
77	TOWN OF SALEM TAX COLLECTOR	10/1/2018	3/31/2019	12/31/2018	11/19/2018	1,046	(90.00)	132.00	42.00	43,932	
78	TOWN OF SALEM TAX COLLECTOR	4/1/2018	9/30/2018	7/1/2018	6/11/2018	814	(90.50)	111.00	20.50	16,687	
79	TOWN OF SALEM TAX COLLECTOR	10/1/2018	3/31/2019	12/31/2018	11/19/2018	873	(90.00)	132.00	42.00	36,666	
80	TOWN OF SALEM TAX COLLECTOR	4/1/2018	9/30/2018	7/1/2018	6/11/2018	12,833	(90.50)	111.00	20.50	263,077	
81	TOWN OF SALEM TAX COLLECTOR	10/1/2018	3/31/2019	12/31/2018	11/19/2018	13,782	(90.00)	132.00	42.00	578,844	
82	TOWN OF SALEM TAX COLLECTOR	4/1/2018	9/30/2018	7/1/2018	6/11/2018	996	(90.50)	111.00	20.50	20,418	
83	TOWN OF SALEM TAX COLLECTOR	10/1/2018	3/31/2019	12/31/2018	11/19/2018	1,075	(90.00)	132.00	42.00	45,150	
84	TOWN OF SALEM TAX COLLECTOR	4/1/2018	9/30/2018	7/1/2018	6/13/2018	641,746	(90.50)	109.00	18.50	11,872,301	
85	TOWN OF SALEM TAX COLLECTOR	10/1/2018	3/31/2019	12/31/2018	11/19/2018	692,920	(90.00)	132.00	42.00	29,102,640	
86	TOWN OF SPRINGFIELD	4/1/2018	9/30/2018	7/1/2018	6/11/2018	144	(90.50)	111.00	20.50	2,952	
87	TOWN OF SPRINGFIELD	10/1/2018	3/31/2019	12/31/2018	11/29/2018	124	(90.00)	122.00	32.00	3,968	
88	SURRY	4/1/2018	9/30/2018	7/1/2018	6/21/2018	1,492	(90.50)	101.00	10.50	15,666	
89	SURRY	10/1/2018	3/31/2019	12/31/2018	11/19/2018	1,505	(90.00)	132.00	42.00	63,210	
90	TOWN OF WALPOLE	10/1/2018	3/31/2019	12/31/2018	1/9/2019	68,521	(90.00)	446.00	356.00	24,393,476	
91	TOWN OF WALPOLE	4/1/2018	9/30/2018	7/1/2018	6/13/2018	54,763	(90.50)	109.00	18.50	1,013,116	
92	TOWN OF WALPOLE	10/1/2018	3/31/2019	12/31/2018	12/11/2018	59,038	(90.00)	110.00	20.00	1,180,760	
93	TOWN OF WALPOLE	10/1/2018	3/31/2019	12/31/2018	1/9/2019	21,712	(90.00)	446.00	356.00	7,729,472	
94	TOWN OF WALPOLE	4/1/2018	9/30/2018	7/1/2018	6/13/2018	17,481	(90.50)	109.00	18.50	323,399	
95	TOWN OF WALPOLE	10/1/2018	3/31/2019	12/31/2018	12/11/2018	18,514	(90.00)	110.00	20.00	370,280	
96	TOWN OF WINDHAM TAX COLLECTORS OFFICE	4/1/2018	9/30/2018	7/1/2018	6/6/2018	21,463	(90.50)	116.00	25.50	547,307	
97	TOWN OF WINDHAM TAX COLLECTORS OFFICE	10/1/2018	3/31/2019	12/31/2018	11/29/2018	31,287	(90.00)	122.00	32.00	1,001,184	
						\$ 4,849,638			\$	84,698,643	17.46

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